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FM 11-22

WAR DEPARTMENT FIELD MANUAL

**SIGNAL OPERATIONS
IN THE
CORPS AND ARMY**

WAR DEPARTMENT • JANUARY 1945

WAR DEPARTMENT FIELD MANUAL
FM 11-22

This manual, together with FM 11-21 (when published); supersedes FM 11-20, Organizations and Operations in the Corps, Army, Theater of Operations, and GHQ, 11 November 1940, including C1, 12 June 1941.

SIGNAL OPERATIONS
IN THE
CORPS AND ARMY



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For explanation of symbols, see FM 21-6.

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SECTION I

GENERAL

1. Purpose

The purpose of this manual is to outline briefly the organization of the corps and army, the organization and operation of assigned signal corps units, and the application of signal corps activities to tactical operations. This manual is based upon Field Service Regulations, FM 100-5, 100-10, and 100-15, and assumes an understanding of the fundamental doctrines of signal corps activities as set forth in FM 24-5, 24-18, 24-20, and 11-5.

2. Organization

The organizations of corps and army headquarters have been covered in general terms only, as have the signal sections of these two headquarters. Organization of the signal sections is such as to be adequate under most situations. However, for best results all available personnel and equipment should be organized into teams and subsections to meet the needs of the situation. The composition of these various teams has been outlined to provide a guide to such organization for training and for operation.

3. Equipment, Supplies and Transportation

T/E 21, Table of Clothing and Individual Equipment serves as a basis for determining the allowances of clothing and items of quartermaster individual equipment for all personnel. The issue of training equipment is governed by Tables of Allowances, War Department Circulars, and Army Regulations. Organizational equipment, supplies, and transportation, in sufficient quantities to permit the effective functioning of each unit, are prescribed by Tables of Organization and Equipment, or by Tables of Equipment that are numbered to agree with the unit's T/O. AR 310-60 contains a detailed explanation of the foregoing tables. In certain situations, specialized equipment and bulky materials may be carried in stock at higher echelon depots in a theater of operations for issue to units as required. Equipment and supplies peculiar to each unit are mentioned to the extent necessary to explain the operation of that unit, since the successful and effective operation of tactical units in the field depends to a large extent upon efficient training in the use, care, and maintenance of organizational equipment. Unit commanders must keep up their full authorized allowances of organizational equipment and supplies at all times.

4. Command of Attached Organizations

Portions of any signal corps organization of a higher unit may be attached to lower units. Such attached signal organizations or detachments are under the supervision of the signal officer of the unit to which attached, to the same extent as are the organic signal troops, except when they are attached for rations and quarters only. In this case supervision is retained by the senior unit.

SECTION II

CORPS ORGANIZATION AND EMPLOYMENT

5. Organization

The organic elements of the corps consist essentially of a headquarters and headquarters company; a signal battalion; a headquarters and headquarters battery, corps artillery; and a field artillery observation battalion. Normally the corps will be composed of two or more divisions, and may be reinforced by—

- a.* Field artillery units.
- b.* Antiaircraft artillery units.
- c.* Armored units.
- d.* Tank destroyer units.
- e.* Engineer units.
- f.* Air force units.
- g.* Chemical units.
- h.* Cavalry reconnaissance units.
- i.* Service organizations.

6. Employment

a. The corps is primarily a tactical unit of execution and maneuver organized for flexibility. In operations of long duration the divisions in the line may be relieved by fresh divisions, but the corps usually remains until a decision is reached or the strategical plan is changed.

b. When it is part of an army, the corps performs

administrative and supply functions for corps troops only, unless the army commander delegates such functions to it for all of its components and subordinate units. An exception to this exists in the case of ammunition supply, wherein corps normally handles sub-allocation of credits to divisions under its control.

c. When the corps is operating independently, it is responsible for the administration and supply of corps troops, divisions, and all other assigned or attached units.

d. With suitable reinforcements, a corps may carry on sustained independent operations, functioning essentially as a task force. The composition of a reinforced corps is not prescribed, since it depends on the assigned mission. The general principles of operation and administration governing the operations of an army (FM 100-5, 100-10, and 100-15) are applicable also to a corps, particularly to a reinforced corps operating independently.

e. For details of signal activities in the corps see section V.

SECTION III

SIGNAL SECTION, CORPS HEADQUARTERS

7. Organization

The signal section, corps headquarters, consists of the corps signal officer, his executive officer, and a sufficient number of commissioned assistants and enlisted clerks and draftsmen to permit the section to function properly. The signal section of the headquarters of a reinforced corps is increased in strength so that it can perform its prescribed duties for a greater number of corps troops and subordinate units.

8. Duties

The principal duty of the signal section, corps headquarters, during operation, is to formulate a plan for signal activities, and to insure the fulfillment of that plan. This duty includes—

a. Advising the corps commander on all signal activities.

b. Preparing signal operation instructions (SOI) for approval.

c. Preparing standing signal instructions (SSI), if necessary, to explain the use of any part of the SOI.

d. Preparing signal plan, signal annex, paragraph 5 of the field order, and other signal orders.

e. Preparing standing operating procedure (SOP) for corps signal activities in coordination with inter-

ested general and special staff sections, and in conformity with SOP for signal activities as issued by higher headquarters concerned.

f. Checking the SOP for signal activities of the various corps units and coordinating these with the SOP of higher headquarters.

g. Supervision of signal supply and repair for corps troops (and for divisions if the corps is operating separately or if the army delegates supply functions to the corps).

h. Maintenance of current status records of signal communication facilities in use and available, both military and civilian.

i. Submission of reports, as required, to the signal section of higher headquarters concerning the operating condition and composition of the signal communication system in use by the corps.

j. Cooperation with the signal intelligence section of army or the corresponding section of a higher headquarters, on all matters pertaining to radio intelligence, cryptographic and signal security, and initiation of necessary corrective action in case of violations.

k. The procurement of codes and ciphers from the superior headquarters or other source as directed, and the accounting for and distribution of them to subordinate units and to corps troops.

l. Supervision and assignment of photographic missions to assigned or attached photographic units (FM 11-37).

m. Supervision and coordination of training for corps signal troops, attached signal troops, and corps communication personnel.

9. Signal Section, Headquarters, Reinforced Corps

The signal section of a reinforced corps resembles,

on a smaller scale, the signal section of an army headquarters. It must perform the duties shown in paragraph 8, and, in addition, may supervise supply, repair, photographic, and intelligence functions. This is due to the possibility of assigning personnel from a signal radio intelligence company, a signal depot company, a signal pigeon company, and additional construction, operating, and messenger personnel to the corps when reinforced. For organization and duties of the army signal section see section VII.

10. Operations

a. The corps signal officer controls the technical training and tactical employment of the signal battalion and all other signal corps units assigned or attached to the corps unless their control is retained by higher headquarters as explained in paragraph 4. Routine administration, disciplinary matters, and internal operations are the responsibility of the unit commander concerned. The corps signal officer maintains close liaison with the other staff officers and staff sections of his headquarters, with the signal officers of divisions, assigned or attached to the corps, and with the signal officer of army or other higher headquarters. Transportation required for the signal section is provided by the corps headquarters company and the corps transportation service.

b. Signal companies of component divisions are organic to the divisions and as such are controlled tactically, and trained technically, by the division signal officers.

SECTION IV

SIGNAL BATTALION

11. Command

A signal battalion is an organic part of corps troops. The battalion commander is responsible for the administration, discipline, and internal operation of the battalion, and for the execution of its training program and tactical missions as directed by the corps signal officer.

12. Duties

The signal battalion installs, operates, and maintains the corps signal systems. It operates the corps signal dump and performs third echelon maintenance on signal equipment for corps troops.

13. Organization

A signal battalion (T/O & E 11-15) is composed of a headquarters and headquarters company, two signal light construction companies, a signal field operation company, and a medical detachment. Current Tables of Organization show the detailed composition of the various companies and of the medical detachment. The medical detachment usually is attached to the headquarters and headquarters company for administration, supply, mess, and maintenance of its motor vehicles.

14. General

The particular type of tactical organization used will be governed by available equipment, groups or teams of individuals, and transportation. The following considerations should be taken into account: provision for continuous 24-hour operation, availability of specialists where the likelihood of need is greatest, availability of essential equipment where and when needed, and transportation of all equipment and personnel with available vehicles. In order that each relief of the various teams will include one of each type specialist, the wire chief and his assistants must be skilled in several specialties, and other enlisted personnel must be trained in more than one specialty. Training in multiple specialties increases team proficiency and provides for maximum operation and maintenance of all signal agencies. For additional information see section V.

SECTION V

SIGNAL ACTIVITIES IN THE CORPS

15. Reference

For all matters regarding basic general policies and procedures in signal activities, see FM 11-5, 24-5, 24-18, and 24-20. For technical details and operating characteristics of signal equipment, see the various technical manuals listed in FM 21-6.

16. Tactical Function

The corps executes the major tactical missions of the army and maintains the continuity of battle. A corps headquarters and its organic and attached troops constitute the framework for operations in a tactical zone of action in which as many divisions are employed as the conditions of each situation require (par. 6). A corps determines the employment of its divisions, maintains signal communication with them by which it exercises control, directs and coordinates their tactical operations, and supports them with fire of the corps artillery and with such other means as may be available. The width and depth of a corps zone of action are influenced by many factors, such as the composition and number of corps troops, the number and types of divisions under corps control, and the maneuver space required both for the divisions and for the full employment of the fire power of organic and attached artillery.

17. Plans and Orders

a. The orders of the corps commander are prepared in a manner similar to that outlined in FM 101-5. The content and preparation of signal operation instructions, paragraphs 4 and 5 of corps field orders, parts of corps administrative orders, intelligence annex, if issued, and orders for corps signal units conform in general to those pertaining to the division as described in FM 24-5. The content and preparation of the signal portions of corps administrative orders and of corps field orders, if any such portions are required, conform to those pertaining to higher units (FM 101-5).

b. Under combat conditions the control of signal units is simplified greatly by a well-established, comprehensive standing operating procedure which needs only to be modified and supplemented by such oral orders as the tactical situation demands.

18. Scope of Standing Operating Procedure

a. SOP FOR THE CORPS. The corps signal SOP includes fundamental policies concerning signal activities applicable to all components of the corps, and definite plans for signal communication to be provided for the various echelons of corps headquarters. Only essential requirements are included; details are omitted. This portion of the corps SOP is prepared by the corps signal officer and submitted to the assistant chief of staff, G-3, for coordination with the SOP established for motor movements, displacement of echelons, supply and evacuation, and such other operations as lend themselves to standardization. These standardized procedures as a whole constitute the SOP for the corps.

b. **SOP FOR THE SIGNAL BATTALION.** The SOP for the signal battalion, based upon and conforming to the corps SOP, elaborates upon those portions which apply specifically to functions of the battalion. The individual SOP for each company of the battalion elaborates further, enumerating the composition of all teams, the vehicles regularly used, and all detailed procedures which can be standardized and prescribed advantageously.

19. Location of Command Posts

a. **GENERAL.** The signal communication requirements affecting the selection of command posts are explained in FM 11-5. The distances between command posts of higher and lower units depend upon the tactical and logistical requirements of any specific operation.

b. **CORPS.** When the corps is part of an army, the army usually prescribes the location of the corps command post and its axis of signal communication. If the corps is not a part of an army, or if the army, of which it is a part, has not prescribed these locations, they are decided upon and announced by the corps commander. The corps command post should be near enough to the front to facilitate signal communication with, and control of, subordinate units for a considerable period of time during an advance; and yet not so close to the front that possible local reverses would necessitate its movement to the rear. The length of time required to establish the corps signal communication system demands that the command post be moved no oftener than is required for proper control of subordinate units. No hard and fast rules can be prescribed for the distance at which the corps command post should be located in the rear of the front line.

The maximum distance in any case is influenced by the terrain, the disposition of enemy forces, and the distance over which satisfactory communication can be maintained. For other basic factors governing the selection of command post locations, see FM 100-5 and 11-5.

c. CORPS TROOPS. The units included in corps troops may be required to operate anywhere in the corps zone of action, and the locations of their command posts depend primarily on the area of their employment. Consideration must be given to maintaining signal communication between corps headquarters and supported units. The talking range of wire circuits must be considered carefully when establishing wire lines between the echelons of corps headquarters and installations of corps troops. In highly fluid situations it may be necessary to employ long range field wire with repeaters, and radio to establish satisfactory communication.

d. DIVISION. When the division is part of a corps, the corps usually prescribes the general location of the division command post and the axis of signal communication. The locations of division command posts in some situations may be selected by the division commanders. Locations selected are reported promptly to superior, subordinate, and adjacent units. The references and basic considerations concerning the location of corps command posts also apply to the selection of division command post sites (FM 7-24).

20. Signal Supply

a. The corps signal officer is responsible for signal supply and the recovery, evacuation, salvage, and repair of signal equipment of corps troops. He will reclaim serviceable items for reissue within the command. When the corps is operating alone, or when

supply functions have been delegated to it by higher authority (par. 6), the corps signal officer has the same duties with respect to the signal supply of divisions as does the army signal officer when the corps is operating as part of an army.

b. Units of corps troops usually secure their signal supplies from an army signal depot, designated railheads or supply points. Corps troops submit requisitions to the corps signal officer who forwards them to the army signal officer.

c. In exceptional cases, in order to facilitate the repair function of corps troops, the practice of augmenting corps repair sections with small, mobile repair detachments is followed. These repair detachments come from the signal repair company of the army.

d. The policy of pooling specified items of supplementary equipment has been established, and is controlled by the army signal officer. This pool facilitates the distribution of important equipment for specialized tasks.

e. Details of signal supply, recovery, evacuation, salvage, and repair procedures are set forth in TM 38-220, 38-403, 38-505, and 38-205. Supply channels and depots are explained in FM 100-10. Additional reference data are contained in FM 101-10.

21. Photography

Signal photographic units are not normally an organic part of corps troops, but may be assigned or attached to the corps if circumstances warrant. Such assigned photographic troops are employed tactically under the command of the corps signal officer (par. 54). Attached photographic personnel are employed similarly unless they are attached for specific photographic missions only.

22. Signal Intelligence

The corps assistant chief of staff, G-2, is responsible for the signal intelligence activities within the corps.

a. Two radio intelligence platoons are included in the corps signal battalion. These platoons perform the signal intelligence functions for the corps. Normally these platoons are controlled directly by the corps. However, occasion may arise where it is desirable to attach a platoon to a division. In addition, the army usually will exercise general supervision over all platoons within the army area. Signal corps personnel in corps troops may be directed to assist in signal intelligence activities in addition to their signal communication duties. All signal communication personnel should be trained to recognize and report immediately any information of value to the signal intelligence effort. These reports are made to the unit signal officer who forwards them to the nearest G-2. For detailed discussion of signal intelligence, see FM 11-35.

b. Contained within the corps signal battalion headquarters is the traffic analysis section, composed of traffic analysis officers and necessary enlisted traffic analysis assistants, who perform traffic analysis functions for the corps. It is the function of this section to work in conjunction with the corps G-2, the corps signal officer, and the army intelligence service, in the analysis of enemy communications. Information gained from the radio intelligence platoons of the corps signal battalion will be processed and evaluated by this section and recommendations made to the corps G-2 and corps signal officer concerning signal intelligence and counterintelligence measures to be taken by corps troops. In general, this section will be concerned chiefly with lower echelon communication systems of

the enemy. Close liaison must be maintained with the army signal intelligence service to facilitate the handling and evaluation of enemy communications. The traffic analysis section also performs intelligence work.

23. Message Centers

Message centers are established at the command post and the rear echelon as a matter of routine, and advance message centers are employed as required. Detailed procedures and instructions for the routine operation of message centers, and information as to the authority of commanders to depart from prescribed procedures, are given in FM 24-5 (or FM 24-17, when published). See paragraph 67 for a discussion of signal centers.

24. Messengers

Within the limitations of personnel and transportation available, messenger communication is employed in the corps as follows:

a. Local messengers at the command post, rear echelon, and advance message center(s). (Message originating in one office for delivery to another office in the same echelon are handled by the staff section involved and not by local messengers). Where a message is to be delivered to more than one unit the message center should be furnished one copy for each such office or person plus one file copy. The message center personnel should never be expected to prepare copies of a message.

b. Special messengers operate from each message center when required.

c. Scheduled messengers between the command posts of the corps, divisions, major units of corps troops, and

corps rear echelon. The corps railhead and miscellaneous units of corps troops may be included if located conveniently, or if the volume of message traffic requires this service.

d. Airplane messenger service will come from a headquarters higher than corps and may be used between the corps command post, rear echelon and advanced message center. Drop and pick-up message service may be furnished forward units.

25. Pigeons

a. For general information concerning the capabilities, distribution, and use of pigeons, see FM 11-5, 11-80, and 24-5. See also discussion on army signal pigeon company in paragraph 55.

b. Pigeon communication is employed in the corps as follows:

(1) Lofts and personnel attached to the corps by higher headquarters usually are retained under corps control. They may be attached to subordinate units if the situation permits and time is available to establish lofts and settle pigeons.

(2) If the corps is operating independently, lofts and pigeon personnel assigned to corps by higher headquarters may be retained under corps control or allotted to subordinate units, depending upon the situation and the time available to establish lofts and settle pigeons.

(3) When, in lieu of the attachment of lofts and personnel, higher headquarters distributes pigeons to the corps headquarters, further distribution to subordinate units is made by the corps. Only in exceptional circumstances are any retained for release by corps headquarters.

26. Radio

a. GENERAL. Radio is the primary means of signal communication with and within corps reconnaissance elements, aviation units attached to the corps, and also with and within moving motorized, mechanized, and armored units. As soon as wire communication is established between units, radio communication between such units generally is restricted. Some of the radio operators are employed to guard the assigned frequencies while others are used for security monitoring. Radio stations are kept in readiness to resume instant operation when needed. It should be remembered constantly that the enemy can prevent the employment of radio communication by jamming. The importance of corps radio nets makes them a logical target for enemy jamming. The plan of operation of radio nets should include the necessary measures to get radio messages through enemy interference by operating through jamming, by using alternate frequencies or frequencies retained by the corps signal officer for emergency use, or by the use of another means of signal communication. The most important factor in obtaining reliable radio communication is in maintaining strict radio discipline and correct radio procedure. When several radio sets are operated together at a distance from a command post it may be desirable to establish a radio control center (par. 36).

b. RADIO NETS OF HIGHER HEADQUARTERS. The corps establishes and operates a station at its command post as a subordinate station in the army or other higher headquarters command net. (See par. 70 for information on army radio nets.)

c. CORPS RADIO NETS. (1) *General.* Certain radio nets which may be established by a corps are shown

in TM 11-462. The radio nets illustrated are not to be considered as the only nets which may be organized or as including all the stations which may be placed in the net shown. Whenever the situation demands, provided suitable radio sets and frequencies are available, the corps commander reorganizes his existing nets, or organizes additional nets to meet his special requirements for radio communication. The principal radio nets employed by a corps are explained below.

(2) *Corps command net.* The corps command net includes the forward echelon of corps headquarters and the command posts of all assigned and attached divisions, of corps artillery and corps antiaircraft artillery, and of assigned or attached tank and tank destroyer units. Other units, such as the corps reserves, also may be included. The corps command net may be utilized as the corps primary warning net to alert the command to enemy air, mechanized, gas, airborne, or ground attack. In case of heavy traffic, two command nets may be established.

(3) *Corps reconnaissance net.* A reconnaissance net is established to provide communication between reconnaissance elements and the corps command post, and to provide for expeditious handling of enemy information of vital interest to the assistant chief of staff, G-2.

(4) *Corps administrative net.* An administrative net with stations at the corps command post and the corps rear echelon may be established for emergency use or use in the absence of adequate wire facilities. Railheads, traffic control stations, prisoner of war inclosures, administration and supply, and other installations may be included in this net in the absence of wire communication or in other special circumstances.

(5) *Corps artillery net.* The corps artillery net is

employed to control and coordinate the organic and attached field artillery. The net is auxiliary to the artillery wire system.

(6) *Corps antiaircraft artillery net.* This net includes the command echelons of all corps antiaircraft artillery, and is employed for command purposes.

(7) *Tank destroyer net.* This net may be established for control and coordination of a tank destroyer group or other tank destroyer units assigned or attached to the corps. Headquarters of such tank destroyer units would be included also in the corps command net and might be included in a corps reconnaissance net.

(8) *Tank unit net.* This net is established for the control and coordination of tank units assigned or attached to the corps. The headquarters of such units would be included in the corps command net.

(9) *Special mission nets.* These include nets organized to maintain signal communication with units on special reconnaissance missions; command nets for units on special tactical missions, such as a raid or a reconnaissance in force; special warning nets for security against attacks on key positions; antiaircraft artillery intelligence service net (AAAIS); and nets for other similar tactical purposes.

27. Sound

Usually sound communication is employed in the corps system only to give the alarm in event of gas, air, airborne, or mechanized attack.

28. Visual

Panels and smoke, including colored smoke, are used at the corps command post and also at the command posts of corps artillery and other corps units for com-

munication with airplanes in flight. Pyrotechnic signals may be used occasionally in conjunction with local security measures to organize the defense of corps installations. Signal lamps normally are not used for corps signal communication.

29. Wire

Wire is the primary means of signal communication for most units in the corps. The wire system includes open wire, field wire, cable, switchboards, telephones, manual telegraph, teletypewriter equipment and facsimile. For further details on employment of this equipment see appropriate Field Manuals listed in FM 21-6. Full use should always be made of existing commercial wire facilities in establishing the corps wire system, especially for the longer trunk circuits, since this conserves material and normally permits wire communication to be established more quickly. However, it is not to be assumed that existing commercial facilities will always be available without a great deal of rehabilitation.

30. Construction Center

A construction center is an installation located near or in a command post where wire lines converge for entrance to the telephone central. For a detailed discussion on construction centers refer to FM 24-20.

31. Wire Traffic

Knowledge of the total traffic handled by the telephone, teletypewriter, telegraph, and facsimile facilities in the corps is essential in order to plan the efficient utilization of available wire facilities and equipment and to distribute the traffic load properly. This information

is obtained by keeping records of telephone traffic and of the telegraphic messages transmitted between units in the system. In the absence of these records, estimates are made of the probable traffic loads and the times and duration of peak loads. Bases for these estimates are the traffic loads in simulated tactical operations and actual maneuvers, and records of traffic loads of similar headquarters in past operations of our forces or those of other nations.

32. Wire System

a. **EXTENT AND COMPOSITION.** The number of telephones, local circuits, trunk circuits, and telephone and telegraph channels installed and operated in the corps system depends upon the time available, the requirements of the situation, the existing wire facilities, the orders of the commander, available equipment and supplies, and the capabilities of the signal personnel. The fundamental principle to be observed in determining the extent and complexity of the wire system is to install no more than is absolutely necessary for adequate control. Certain things must be considered in determining minimum requirements, the more important of which include the type of action (fluid or stabilized), the number and type of troops controlled, and the traffic handling capacity of signal communication agencies and means. A stabilized position usually warrants a more elaborate installation than those occupied successively during an advance, and an organized defensive position justifies a more elaborate wire system than one occupied for a relatively short time, such as during a delaying action. Successive installations must not be so extensive that signal troops are taxed to the point of exhaustion.

b. **LOCAL TELEPHONE REQUIREMENTS.** In a complete

installation for a stabilized location, wire communication may be provided as shown in the list following. This is intended to serve as a guide only. Several of the staff sections require more than one local circuit, depending on the volume of traffic. During rapidly moving tactical situations, the number of local circuits installed would be reduced greatly and two or more sections or individuals would use the same telephone, while some locals listed would not be installed.

LOCAL TELEPHONE INSTALLATIONS FOR A CORPS

<i>Command post</i>	<i>Rear echelon</i>
Corps commander	Message center
Aides	Adjutant general's section
Message center	Inspector general's section
Chief of staff	Chemical section*
G-1 section	Corps quartermaster service
G-2 section	Judge advocate general's section
G-3 section	Finance section
G-4 section*	Ordnance section*
Public telephone	Public telephone
Artillery section	Chaplain's section
Corps antiaircraft artillery	Medical section*
Engineer section	G-4 section*
Chemical section*	Radio stations
Signal section	Special services officer
Representative of supporting aviation	Signal battalion detach- ment
Ordnance section*	Headquarters company de- tachment
Medical section*	Motor park

* May require local telephone service at both echelons.

Headquarters	commandant	Wire chief
Radio stations		Chief telephone operator
Liaison officers		Chief teletypewriter operator
Provost marshal		Postal officer
Signal battalion		Pigeon loft
Military police company		
Motor park		
Wire chief		
Chief telephone operator		
Chief teletypewriter operator		

c. PRIORITY OF INSTALLATIONS. No universally applicable sequence of installation of telephones can be prescribed. Priority of installation of certain telephones can be established in a general way with the understanding that the actual sequence of installation will depend on the current situation and other factors. Telephones for the message center, the corps commander or his chief of staff, and a public telephone for general use should be installed first. Telephones should be provided next for the general staff sections. The special staff section telephones then should be installed, followed by the other telephones required. If the installation of telephones can be completed before the command post opens, the sequence of installation is of relatively little consequence, except that invariably the telephone for the message center is installed first.

d. TELEPHONE TRUNK AND LONG LOCAL CHANNELS.

(1) The following table lists the telephone trunk and long local channels of a corps wire system that are desirable in a stabilized situation. This list is to be used as a guide only as it does not list all of the trunk or

long local circuits that may be required. It does not include channels provided by higher headquarters.

Unit to which connected	Trunk or long local channels
<i>From command post</i>	
Divisions	2 to each division.
Corps artillery headquarters.....	2.
Corps antiaircraft artillery.....	2.
Tank destroyer group or other unit (assigned or attached).....	1 (or more).
Mechanized cavalry groups.....	1 each.
Engineer groups or separate bat- talions	1 .
Corps reserve.....	1 .
Adjacent corps on the right*.....	2.
Rear echelon.....	4 (or more).
Signal battalion.....	2.
<i>From rear echelon</i>	
Railheads (corps and division).....	2.
Medical units.....	2.
Ordnance	1.

* Or as directed by common superior.

(2) Appropriate personnel of the signal corps units assigned or attached to the corps are responsible for the installation and maintenance of the wire system required to provide these channels. Circuits previously installed by divisions often may be utilized partially to fulfill the requirements. Increased use of carrier equipment will reduce the number of physical circuits needed to provide the desired channels.

e. TELEPHONE SWITCHING CENTRALS. (1) *Installation.* Telephone switching centrals utilizing available

switchboards, telephone central office sets, and associated equipment are installed at the command post, the rear echelon, advance message center(s), and at other locations and installations as required by the operations involved. Switching facilities at the headquarters of units of corps troops other than signal corps are installed by communication organizations organic to such units. Switching centrals may be installed at the junction of several wire lines and at other critical locations to provide greater flexibility and more efficient use of the available wire lines. (See FM 24-20 for additional information on switching centrals.)

(2) *Types.* The type of switchboard used for any installations will depend on the available equipment and on specific requirements. Existing military and commercial facilities are utilized to the greatest practicable extent. For list of reference manuals giving details of military telephone switching equipment, see FM 21-6.

33. Teletypewriter and Manual Telegraph

a. CIRCUITS. The most efficient utilization of wire line facilities is achieved by superimposing telegraph and teletypewriter channels on circuits which provide the telephone channels.

b. MANUAL TELEGRAPH SETS. Manual telegraph sets may be used to provide an auxiliary communication means for the corps on certain long local lines, and to such installations as ammunition distributing points, railheads, and advance message centers, depending on the availability of equipment, channels, and operators. They also may be held in reserve for use if teletypewriter equipment fails, or for use on channels unsuited for teletypewriter operation. Phantom circuits or carrier channels are used for telegraph operation whenever

adequate equipment is obtainable. If ground-return circuits must be used, existing telephone circuits should be utilized by simplexing.

c. **TELETYPEWRITERS.** The teletypewriter is the principal telegraphic communication facility for the corps because of its high traffic capacity, ease of operation, accuracy of transmission, and convenience. Where several teletypewriters are located in the same general vicinity, teletypewriter switching centrals are used to permit a limited number of trunk channels to serve all local teletypewriter stations. The flexibility provided by switching equipment makes all trunk channels accessible to any local station and permits maximum utilization of the trunk channels provided.

d. **TELETYPEWRITER STATIONS.** Teletypewriter stations may be installed at any or all of the following locations, and at such other places as the tactical situation and the composition of the corps may require. The number of stations will be limited by the equipment and operating personnel available.

TELETYPEWRITER STATIONS

<i>Command post</i>	<i>Rear echelon</i>
Message center	Message center
G-2 section	G-4 section
G-3 section	Corps quartermaster service
G-4 section	Corps railhead

e. **TELETYPEWRITER TRUNK CHANNELS.** The trunk channels listed in the following table are desirable for the corps when the wire system is adequate to provide them. Normally wire lines in excess of those needed to fulfill the telephone channel requirements will not be built to provide additional teletypewriter trunk channels. A teletypewriter switching central normally

should be installed at the command post and at the rear echelon for flexible interconnection of local stations to available trunk channels.

Unit to which connected	Teletypewriter trunk channels
<i>From command post</i>	
Divisions	2 to each division (one channel is to G-2 - G-3 team).
Rear echelon.....	2 (or more).
Army (may be reached through rear echelon teletypewriter switching central).....	1 (or more).
Supporting aviation (reached through army teletypewriter switching central or by direct circuit)	
Adjacent corps.....	2.
<i>From rear echelon</i>	
Army or other higher headquarters (provided by higher unit)....	2 (or more).

f. **MILITARY TELETYPEWRITER EQUIPMENT.** For a detailed description of military teletypewriter equipment and information on its operation and maintenance, see pertinent manuals listed in FM 21-6.

34. Carrier Systems

Carrier systems provide multiple telephone and telegraph channels over the same physical circuit. Their use permits a reduction in the number of physical circuits needed to provide a given number of telephone and telegraph channels with a consequent saving in

time, manpower, and construction material, but requires a greater amount of terminal equipment. The saving in construction material, labor, and time, on long wire lines more than offsets the additional terminal equipment required, especially when wire line construction is difficult. Carrier systems are included in the plans of the corps signal officer when distances and terrain make their use desirable. For reference manuals giving the characteristics of carrier systems and equipment see FM 21-6.

35. Circuit Diagram of Corps Wire System

A circuit diagram of a corps wire system is shown in TM 11-462. The illustration should be used as a guide only. The circuit diagram presents a suitable and convenient method of representing a wire system schematically. Approved symbols for use with circuit diagrams are included in TM 11-462, FM 21-30 and 24-20, and are to be used on all such diagrams to insure uniform interpretation.

36. Signal Equipment Power Supply

Usually provision is made in the design of military signal equipment for individual power supply units of the type and size required by the equipment. The larger power units may have capacities considerably in excess of the actual power requirements of the equipment with which they are issued. These power units should be used whenever possible as a central source of power for several items of signal equipment grouped together, and the smaller units should be held in reserve. Suitable power from existing commercial or military plants, if available, is preferable to that from field power sources and should be used whenever available in order to conserve power units.

SECTION VI

ARMY

37. Organization

An army consists of an army headquarters, two or more corps, and certain army troops as required (FM 101-10). Other troops temporarily attached to an army may be retained as army troops, or reallocated to its corps in accordance with their needs. One or more of the several types of divisions may be allotted to an army. Service troops are allotted to an army as needed and additional combat units may be similarly allotted as warranted by the mission of the army. A type army containing three corps and having a strength of about 185,000 is used for the purposes of this manual. For a detailed discussion of armies see FM 100-15.

38. Signal Activities

All signal activities for the army, except those performed by and within the subordinate units, are handled by the signal section of army headquarters or by the units composing the army signal service. Normally the army signal service includes a signal operation battalion, two signal construction battalions, a signal photographic company, a signal pigeon company, a signal radio intelligence company (or battalion), a signal depot company, and a signal repair company. The duties and organization of these units are discussed in

subsequent chapters. Additional signal corps units of any type may be assigned, or temporarily allotted, to an army to meet its requirements.

39. Signal Supply (FM 100-10)

a. The army signal depot maintains stockages of signal equipment, parts, and supplies at levels prescribed by the army commander. They are stored at the depot or at advance supply points.

b. The army normally directs issue of signal supplies from army signal depots, or infrequently arranges, through the regulating officer, for shipment from the communications zone direct to railheads, truckheads, or other advance supply points.

c. The army establishes supply points within reach of the using units. The division commander informs his units of signal supplies available and of their location. Thereafter regimental and separate battalion commanders are responsible for drawing and distributing these supplies to their battalions and companies. For information concerning requisitions, see FM 100-10.

d. Signal construction battalions may establish matériel yards for pole-line construction equipment. These serve as temporary battalion supply points.

40. Evacuation

a. Battlefield recovery of signal equipment is a function of divisions or other combat units in the forward areas. These troops will be responsible for getting the equipment to designated collecting points on the axes of evacuation (or supply). Division or corps signal officers will reclaim serviceable items for reissue within their commands. Unserviceable items are transported from collecting points to railheads or signal

depots by units designated by the army. Evacuation from railheads is normally by returning daily trains. Signal depot companies will process assembled damaged equipment and determine whether it should be repaired and released or salvaged for parts.

b. Captured enemy signal equipment, if usable and of known type, is repaired and placed in stock for issue. If not of known type, it is returned through signal supply channels to the theater signal officer for study, identification, and forwarding to the zone of the interior, or other designated locality.

SECTION VII

SIGNAL SECTION, ARMY HEADQUARTERS

41. General

The signal section of army headquarters is the office of the army signal officer. The army signal officer controls the technical training and tactical employment of all signal corps units assigned or attached to the army. Subject to such other instructions as may be issued by him, the operation of the several subsections composing the signal section are as indicated in paragraphs 44 to 50 inclusive. A general coverage of training, supply, photography, signal intelligence, and signal communication functions of the signal corps appears in FM 11-5. For further details see pertinent manuals listed in FM 21-6. In addition to those contacts maintained by officers in charge of the various subsections, each officer maintains close contact with commanders of appropriate signal units of the army, with corps signal officers, with communication officers of army troops, with communication officers of supporting aviation, and with corresponding subdivisions of the next higher signal service.

42. Transportation

Transportation required by the army signal section is obtained from the army headquarters transportation pool.

43. Organization

The signal section of army headquarters is not divided into subsections in the Tables of Organization (T/O & E 200-1). The duties of the various officers and enlisted personnel are, however, indicated therein. For a better understanding of the operation of the signal section the functional breakdown into subsections is used in the succeeding paragraphs (See fig. 1.)

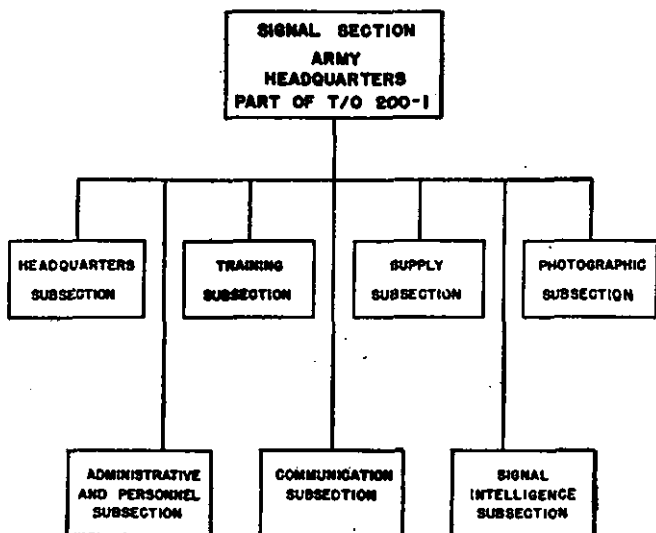


Figure 1. Functional break-down of the signal section, army headquarters.

44. Headquarters Subsection

The headquarters subsection consists of the army signal officer, deputy army signal officer, an executive officer, and certain enlisted clerical assistants. The army signal officer, with the assistance of the headquar-

ters subsection, controls and directs the operation of the signal section. The scope of such control and the necessary contacts with the various sections of the army commander's staff are discussed in FM 11-5. Among other matters, this subsection directs and coordinates the preparation of all items of SOI, prepared by other signal subsections for issue by army headquarters.

45. Administrative and Personnel Subsection

The administrative and personnel subsection consists of the officer in charge, a warrant officer assistant, and enlisted clerical assistants. It is charged with the general administration of the entire signal section of army headquarters, and with the handling of all matters within the province of the army signal officer pertaining to the procurement, classification, and assignment of signal and communication personnel and replacements within the entire army. It maintains close contact with assistant chief of staff, G-1, the adjutant general of the army, and with commanders of replacement centers and replacement depots charged with furnishing replacements to the army.

46. Training Subsection

a. **GENERAL.** The training subsection, composed of the officer in charge, one or more officer assistants, and enlisted clerical assistants, is charged with the handling of all matters within the province of the army signal officer regarding the training of signal and communication units of the entire army, and the coordination of that training.

b. **PRIMARY DUTIES.** The training subsection—

(1) Supervises the training of all signal and com-

munication units in the army.

(2) Recommends the establishment and discontinuance of signal and communication troop schools of the army.

(3) Recommends the nature and extent of inspections of training.

(4) Maintains close contact with the G-3 section of army headquarters.

(5) Prepares and recommends the issuance of any SOP or SOI considered necessary for training purposes (in coordination with the communication, supply, and signal intelligence subsections).

(6) Keeps abreast of the latest developments in signal and communication equipment.

(7) Obtains and recommends the circulation of training films (unless such circulation is controlled by a service command within the continental United States only).

47. Supply Subsection

a. GENERAL. The supply subsection, consisting of the officer in charge, one or more officer assistants, and enlisted clerical assistants, is charged with the handling of all matters within the province of the army signal officer regarding the supply of signal corps equipment and supplies to all units of the army.

b. DUTIES. Among other duties, the supply subsection—

(1) Recommends and supervises the tactical employment of the signal depot company and the signal repair company.

(2) Recommends and supervises the establishment and discontinuance of army signal depots, and of signal sections of general depots if any are established;

supervises their operation; and makes provision for adequate stocks of equipment and supplies therein.

(3) Performs, for the signal officer, all routine operations regarding signal supply for troops of the army.

(4) Recommends and supervises the establishment of army repair installations and of procedures pertaining to repair and preventive maintenance, recovery and evacuation, and salvage and reclamation of signal equipment.

(5) Maintains close contact with the assistant chief of staff, G-4, of the army headquarters and with the commanders of the army general depots if any are established.

(6) See also paragraph 46*b*(5).

48. Communication Subsection

a. GENERAL. The communication subsection, comprising the officer in charge, several officer assistants, and enlisted wire and radio plant chiefs, installer-repairmen, draftsman and clerical assistants, is charged with the handling of all matters within the province of the army signal officer regarding signal communication in the entire army.

b. FUNCTIONAL ORGANIZATION. This subsection is further subdivided on a functional basis, into wire, radio, and miscellaneous subgroups. Except for the personnel retained by the subsection chief as his immediate assistants in directing the operation of the entire subsection, such officers and enlisted men as are necessary are assigned by him to these three subgroups. Matters pertaining to more than one subgroup are handled or coordinated by the chief, or his immediate assistants; those pertaining solely to wire communica-

tion are charged to the wire subgroup, those pertaining to radio communication to the radio subgroup, and those pertaining to all other means of signal communication to the miscellaneous subgroup.

c. DUTIES. Among other duties, the communication subsection—

(1) Recommends and supervises the tactical employment of the signal operation battalion, the signal construction battalions and the signal pigeon company of the army signal service.

(2) Obtains information concerning the signal systems of corps and lower units, and commercial and other signal facilities in the army area.

(3) Plans and makes provision for extensions of the army signal system to relieve corps and divisions of operating and maintaining rear installations to permit those units to push their systems forward.

(4) Makes studies of traffic handling in all units of the army, and, on this basis, recommends changes in construction, operation, and maintenance procedures and equipment to expedite or improve such handling.

(5) Coordinates action with the training subsection for changes in established SOP and for the training of personnel, and with the supply subsection for the procurement of suitable equipment.

(6) Prepares the item of SOI concerning allocation of frequencies.

(7) Maintains close contact with assistant chiefs of staff, G-3 and G-4, the adjutant general, and the heads of the principal supply services of the army.

(8) Keeps abreast of new developments in equipment.

49. Signal Intelligence Subsection

a. GENERAL. The signal intelligence subsection, to-

gether with the signal radio intelligence company (or battalion) assigned to the army signal service, comprises the signal intelligence service of the army. These operate under control of the army signal officer. This subsection is strictly an operating agency and is charged with supervision and conduct of all signal intelligence activities within the army. It is not organized to carry on research or production activities, such as the War Department signal intelligence service performs, but functions in close cooperation with the latter in order to insure maximum coordination of all signal intelligence agencies of the field forces.

b. ORGANIZATION. The following functional breakdown is normal, but not prescribed:

- (1) Administrative.
- (2) Radio intelligence.
- (3) Security.
- (4) Solution.

c. DUTIES. The officer in charge of this subsection is the army cryptographic security officer, and the other officers normally are designated as assistants for the performance of this duty. Among other duties, the subsection recommends, to the army signal officer, the tactical employment of the signal radio intelligence company (or battalion) of the army. The subsection likewise supervises its operation. To obtain optimum employment of all radio intelligence means in the army, the subsection also recommends necessary supervisory actions pertaining to the radio intelligence platoons of corps signal battalions. It prepares those items of SOI pertaining directly to signal security and intelligence (par. 46*b*(5)), such as cipher keys and instructions for the use of codes and cipher systems. Items involving both signal communication and signal security, such as

code supplements and authentication codes, are prepared in collaboration with the communication subsection. The solution subgroup does not perform original cryptanalysis, but concentrates on the decryptographing of intercepted messages involving those codes and cipher systems for which the solutions have been compiled and furnished by the War Department signal intelligence service. For a detailed discussion of other duties of the subsection and for more complete information concerning signal intelligence activities, see FM 11-35.

50. Signal Photographic Subsection

This subsection, under control of the photographic officer, is charged with the planning, coordinating and supervising of all photographic activities in the army. Careful planning is necessary in order to obtain combat coverage required by the War Department and by the army commander. Coordination is important especially when more than one photographic agency is operating in the army area. The subsection has been provided with two officers to allow one to be available for continuous field supervision while the other handles the numerous administrative duties connected with photographic activities (TM 11-409 and FM 11-37, when published).

SECTION VIII

SIGNAL CORPS ORGANIZATIONS IN THE ARMY

51. General

a. **COMMAND.** Unit commanders are responsible for the internal administration and discipline of their units, for the execution of training directives initiated by the army commander, and for the development and use of proper operating procedures and techniques to accomplish the missions assigned to their units.

b. **DUTIES.** The duties of each of these organizations are stated in general terms in the following paragraphs. Signal corps activities in the army are discussed in section IX.

c. **ORGANIZATION AND EQUIPMENT.** Units in the army are organized and equipped on the basis of pertinent T/O & E's to perform all duties for which they are responsible. Applicable T/O & E's are indicated in the following paragraphs.

52. Signal Operation Battalion

a. **DUTIES.** The principal duties of the signal operation battalion are the installation, operation and maintenance of the telephone, manual telegraph, teletypewriter, radio, and associated signal communication facilities at all echelons of army headquarters, and at other installations or establishments as required. It

installs local circuits at the various establishments of army headquarters, but is not organized to construct trunk circuits.

b. ORGANIZATION AND EQUIPMENT. The signal operation battalion (T/O & E 11-95) consists of a headquarters and headquarters detachment (T/O & E 11-95); two signal operation companies (T/O & E 11-97); and a medical detachment.

53. Signal Light Construction Battalion

a. DUTIES. The signal light construction battalions are responsible for the rehabilitation and maintenance of all wire lines, both military and commercial, taken over for use by army headquarters, and for the construction and maintenance of all additional trunk circuits required for the wire system. One or both of the light construction companies (or construction platoons thereof) may be used to assist other signal corps units in wire line construction.

b. ORGANIZATION AND EQUIPMENT. The signal light construction battalion (T/O & E 11-25) consists of a headquarters and headquarters detachment (T/O & E 11-26); two signal light construction companies (T/O & E 11-27); and a medical detachment. In some cases armies have signal heavy construction battalions instead of the light battalions. In these cases see T/O & E 11-65 and T/O & E 11-67.

54. Signal Photographic Company

a. DUTIES. The duties of the company include—

(1) Taking still and motion pictures (including sound motion pictures) pertaining to the conduct of military operations within the army area to which it is assigned.

(2) Developing and printing still pictures, as required within the force, exclusive of those charged to the Army Air Forces and the Corps of Engineers.

(3) Producing identification pictures.

(4) Transmitting negatives and prints of still pictures and unprocessed motion pictures by the most expeditious means to the Chief Signal Officer, Attention: Army Pictorial Service, Washington, D. C., or other designated agency.

(5) Maintaining a record of all still and motion pictures taken by the company showing their final disposition.

(6) Recommending measures to be taken to accomplish the assigned photographic missions with maximum efficiency. Such recommendations are made to the photographic officer, army headquarters, and to the signal officer of subordinate units.

(7) Producing training pictures for the assistant chief of staff, G-3.

b. ORGANIZATION AND EQUIPMENT. The signal photographic company (T/O & E 11-37) is composed of a headquarters platoon, an assignment platoon, and a laboratory platoon.

c. PRIMARY MISSION. The primary mission of the company is combat intelligence. Assignments for intelligence coverage take priority over all other assignments. Although intelligence missions are few in number in comparison to other missions, their importance must not be minimized.

d. OPERATIONS. Assignment and identification units of the signal photographic company often are attached to subordinate headquarters for administration, though supervision is retained by the army photographic officer. If assignment units are given general or specific mis-

sions based on requests from the subordinate headquarters supervision may be delegated temporarily to the signal officers of such headquarters. In any case, the signal officers of these headquarters assist the assignment units in the execution of their missions (FM 11-37).

55. Signal Pigeon Company

a. DUTIES. The duties of the pigeon company include—

(1) Continuous breeding and training of pigeons to replace losses which result from combat operations and natural causes.

(2) Distribution of pigeons, protective equipment, feed, and message material from combat lofts to the nearest message center, and collection of empty containers and other equipment used for such distribution when returned to the message center.

(3) Cooperation with, and assistance to, all combat units by training personnel to receive, care for, handle, and release pigeons properly. The pigeon's capabilities are thoroughly explained to unit commanders and all other personnel concerned.

(4) Prompt delivery to the addressee or the nearest message center, as directed by competent authority, of all messages received by pigeon at the combat lofts.

b. ORGANIZATION AND EQUIPMENT. The signal pigeon company (T/O & E 11-39) is composed of a headquarters platoon, three combat platoons, and attached veterinary personnel.

c. OPERATIONS. During operations, one or more of the combat platoons of the signal pigeon company and most of its combat sections are allotted to subordinate tactical units. Tactical control of such platoons

and sections may be delegated to the signal officers of these units. Combat platoons may be assigned to task forces or corps operating independently, and are then, for purposes of training and tactical employment, under the direct control of the signal officer of the unit or headquarters to which assigned (FM 11-80).

56. Signal Radio Intelligence Company

a. DUTIES. The duties of the radio intelligence company are:

(1) The installation, operation, and maintenance of special radio stations employing company equipment for the purposes listed in (2) and (3) below. These two missions, listed in order of relative importance, cannot be performed simultaneously, because of limited personnel and equipment.

(2) Obtaining intelligence by intercepting enemy radio transmissions, and determining probable locations of enemy radio stations by means of radio position finding. These operations are conducted against stations of relatively high power located at the headquarters of divisions and larger units.

(3) Obtaining information about unauthorized radio stations located in an occupied area by intercepting radio transmissions and determining probable positions of such stations.

b. ORGANIZATION AND EQUIPMENT. The signal radio intelligence company (T/O & E 11-77) is composed of a headquarters platoon, a wire platoon, an intercept platoon, and a position finding platoon.

c. OPERATIONS. The nature of the operations of intercept and direction finding sections of the company is such that they are widely dispersed throughout the army area. The various sections may be attached to sub-

ordinate units for rations. It may be necessary to augment the wire communication lines of the company in instances of extreme dispersion.

57. Signal Depot Company

a. DUTIES. (1) *Signal depots.* The signal depot company establishes, operates, and maintains one or more signal depots performing the following principal functions:

(a) The requisitioning, receipt, classification, storage, and issue of signal supplies and equipment, and the establishment and operation of facilities required therefor (FM 100-10).

(b) Local procurement of such supplies and equipment as may be directed or authorized.

(c) Submission of recommendations to the supply subsection of the army signal section concerning actions to be taken and procedure to be followed by using units to conserve signal equipment and supplies.

(2) *Repair.* The signal depot company establishes and operates a fixed repair shop for the maintenance and reclamation of signal equipment including radar, and for the reclamation of supplies including the inspection of salvage and captured matériel as evacuated from forward combat units, and the segregation, receipt, and reclamation of portions of such matériel as pertains to the Signal Corps. This repair shop performs fourth echelon maintenance. It is established usually in the vicinity of, and operates in conjunction with, one of the signal depots established and operated by the company.

b. ORGANIZATION AND EQUIPMENT. The signal depot company (T/O & E 11-107) is composed of a

headquarters platoon, a repair platoon, and three storage and issue sections.

c. OPERATIONS. Radio and wire repair sections may be detached to establish and operate small depots when required to facilitate supply activities. These portions of the company, when located at some distance from the company bivouac, may be attached to convenient units for rations. Their tactical control remains with the army signal officer. Repair sections may be located with such depots as required.

58. Signal Repair Company

a. DUTIES. The principal duties of the signal repair company include—

(1) Third echelon maintenance of all signal equipment within the army area. Its maintenance functions are accomplished by repairing faulty equipment or by replacing faulty parts or components thereof.

(2) The reclamation of signal equipment and supplies when sections of the company operate at a small depot.

(3) Recommending to higher headquarters actions or procedures to be taken or followed by using units to conserve signal equipment and supplies.

b. ORGANIZATION AND EQUIPMENT. The signal repair company (T/O & E 11-127) is composed of a headquarters platoon, ten radio repair sections, and five wire repair sections.

c. OPERATIONS. Radio and wire repair sections operate throughout the army area as needed to perform third echelon maintenance. The sections are located with corps, signal depots or subdepots, army troops, and, in some situations, with divisions, to expedite the

performance of their duties. They do not assume the repair responsibilities of units with which they are located. The army signal officer retains tactical control though the sections may be rationed with units in whose area they are located.

SECTION IX

SIGNAL ACTIVITIES IN THE ARMY

59. References

For basic doctrine of signal activities and procedures, see FM 11-5, 24-5, 24-18 and 24-20. For technical details and operating characteristics of signal equipment employed in army signal systems, see appropriate technical manuals listed in FM 21-6.

60. Tactical Function

The army is the fundamental unit of strategic maneuver. It has tactical and administrative functions. The commander of an army group or of a theater of operations uses the army as a basis for planning and executing strategic and tactical operations. The army commander and his staff plan and execute the operations necessary to accomplish most effectively and decisively the mission assigned to the army. Hence, the command echelon is provided with the signal communication system necessary for obtaining continuous and reliable information concerning the strength, disposition, composition, and movements of enemy forces; for controlling the disposition and coordinating the employment and operations of all components of the army; and for effecting promptly the performance of all administrative and supply functions. For detailed in-

formation concerning the tactical function and operation of an army, see FM 100-15.

61. Plans and Orders

For an outline of the steps required in the formulation of plans for signal communication, see FM 11-5. For the sequence to be followed in making an estimate of the situation in order to assure proper consideration of all elements or factors influencing the plan for signal communication, see FM 101-5. Army signal operation instructions (SOI), paragraphs 4 and 5 of army field orders, signal annexes, intelligence annexes, and orders for units of the army signal service, are comparable in general content to corresponding orders for the division as described in FM 24-5, and conform in style and sequence to the provisions of FM 101-5. The content and preparation of signal portions of army administrative orders also are governed by the provisions of FM 101-5.

62. Standing Operating Procedure

a. GENERAL. Written orders for the control of most signal corps activities carried on within an army are the exception rather than the rule. Repetitive portions of all normal operations are performed as a matter of routine in accordance with established standing operating procedure (SOP), supplemented when necessary by verbal and written orders.

b. COMPOSITION. The army includes instructions to cover all SOP signal activities in the army and influences the various items included in the SOP of each unit under army. Pertinent features of the army SOP should be incorporated so far as practicable in the directives issued by the training subsection of the army

signal section (par. 46), so that all training activities of signal corps troops may be conducted efficiently and coordinated effectively to ensure the successful performance of all signal activities during combat operations.

63. Location of Command Posts

a. GENERAL. The signal communication and other considerations entering into the locations of all command posts are covered in FM 11-5, except for distances between command posts of higher and lower units. Because of the extent of the signal system required by an army, particular emphasis must be placed on existing commercial facilities and those established by lower echelons in the selection of the site for an army command post.

b. ARMY. Usually, when the army is part of an army group, or directly under the control of a theater headquarters (THQ), the group or theater commander prescribes the location of the army command post. If the army is acting independently, or if the command post site has not been prescribed for it by superior authority, it will be decided upon and announced by the army commander. The discussion concerning the location of the corps command post (par. 19*b*) is applicable to the army command post.

64. Activities

a. All signal activities are performed to some extent by the various signal units.

b. Information pertaining to appropriate signal corps units performing such activities is included in various sections of this manual, and in FM 11-5, 24-5, 24-18 and 24-20. For information concerning signal supply

channels and procedures, see FM 100-10, TM 38-220, 38-403, and 38-205 and pertinent circulars issued periodically by the War Department or by the Office of the Chief Signal Officer. For detailed information of signal intelligence activities, see FM 11-35. Attention is invited also to TM 11-450 on training of Signal Corps personnel. For a complete list of available publications see FM 21-6.

65. Means of Signal Communication

All signal communication performed by or within the army is accomplished by using one or more of the means of signal communication as listed in FM 24-5.

66. Message Centers

Message centers are established at the army command post and rear echelon as a matter of routine. However, there will be throughout the army area numerous and widely dispersed administrative establishments for supply, evacuation, sanitation, traffic control and military government, some of which may be grouped in particular localities. In the interest of efficiency it may be desirable to set up other message centers in such localities, especially if several such establishments are located near each other. The locations of these message centers are dependent on their proximity to commercial or previously established military telephone, telegraph, or messenger systems from which they may be served with a minimum of construction or effort. Established commercial telephone centrals or telegraph offices provide ideal locations. These message centers consist of message center personnel, messengers for the routine collection and delivery of messages, and operating personnel for the other signal means employed

by it. For details of message center responsibilities, procedures, and operations, see FM 24-5 or FM 24-17, when published.

67. Signal Centers

A signal center is a unified collection of several agencies of signal communication, including a message center, equipped to transmit and receive messages by electrical means and by other means if required (see FM 24-5 or FM 24-17, when published).

68. Messengers

Within the limits of available personnel and transportation, the following types of messengers are used normally in an army to provide messenger communication:

- a.* Local and special messengers (par. 24*a* and *b*).
- b.* Scheduled messengers, operating between the command posts of the army, corps, major units of army troops, and the army rear echelon as required. Army railheads, various depots, prisoner of war enclosures, miscellaneous units of army troops, major regulating stations, and similar important military establishments within the army area may be served by scheduled messenger service if conveniently located, or if the volume of message traffic warrants this service.
- c.* Airplane service, to be used in an emergency, or if the time factor demands its use, for service to any point required.

69. Pigeons

For tactical considerations governing the use of pigeons see FM 11-5. Pigeons are used to provide communication for various elements of subordinate

units of the army, but they are seldom used in the army signal communication system. See paragraph 55 for an explanation of the operations of a signal pigeon company to provide pigeon communication for lower units. (See also FM 11-80.)

70. Radio

a. GENERAL. (1) The use of radio in the army, with the exception of the following, is essentially an auxiliary means of signal communication:

- (a) With supporting aviation,
- (b) With attached cavalry,
- (c) With attached armored units.

(2) Since it is the only means usually available with and between the excepted forces, it is their primary means. In all other units, radio communication is used pending the establishment of other means, to supplement other means, or to supplant them in case of failure. As soon as wire communication can be established between units, radio communication, if not required to supplement it, is restricted. When radio is restricted the assigned frequencies are still guarded and the radio sets are kept in readiness to resume operation when necessary.

b. SPECIAL SERVICES RADIO STATIONS. The army may decide, or may be required, to operate one or more special services radio stations for the transmission of time signals, press reports, propaganda, counter-propaganda, and may be directed to control or take over the operation of commercial and private radio stations in its area. For information concerning the operation of such stations, see FM 11-5.

c. NETS. A diagram showing the nets which may be established in an army system is included in TM 11-462.

The diagram is not to be regarded as limiting the nets which may be organized, or as prescribing the radio stations which may be included in any net. Whenever the situation demands, and when suitable sets and frequencies are available, the army commander reorganizes his existing nets or organizes new nets to meet his requirements for tactical radio communication. Radio sets and operating personnel not required for regularly established nets may be organized into special mission nets for various purposes within their capabilities, or may be employed in monitoring and intercept work to aid the signal security and signal intelligence efforts, respectively. The radio nets within units of the army troops are normal and do not differ from those of similar units employed elsewhere.

71. Sound

Sound communication is normally used in an army signal system only to give the alarm of gas, mechanized, air, or airborne attack. Prearranged sound signals may be used also to alert the defenses of vital army establishments within limited areas, particularly against air and airborne attack.

72. Visual

Panels, smoke, including colored smoke, and other pyrotechnics, are the visual means normally used in an army signal system. These visual signals are employed at the army command post, at the command posts of army artillery units, and by various other army troops for ground-air communication. Pyrotechnic signals may be used in conjunction with prearranged security measures to alert and organize the local defenses of critical army installations.

73. Wire

Wire is the primary means of signal communication in an army signal system. In addition to the normal wire system for command and administrative purposes, the army may install and operate wire systems for its own warning purposes, and it may be required to install or to assist in the installation of an extensive wire system for the antiaircraft artillery intelligence service. It also may be required to serve, with its wire system, various other special organizations which operate in the army area, or which may be attached to the army by theater headquarters, or by an army group commander.

74. Construction Centers

Construction centers used in an army wire system are similar to those employed in a corps wire system. (See par. 30 and FM 24-20.) Because of the importance of an army wire system and the nature of the terminal equipment, an army construction center should be located in a building, dugout, van, trailer, truck, or other suitable shelter to provide protection for the equipment and reasonably comfortable working conditions for personnel.

75. Wire Traffic

Knowledge of the volume of wire traffic handled by an army wire system is even more important than knowledge of similar traffic in a corps (par. 31).

76. Wire System

a. GENERAL. The army wire system comprises all wire lines and telephone, telegraph, and teletypewriter

operating equipment maintained and operated by the army signal service. It also includes carrier system equipment and apparatus for facsimile transmission. Factors governing the extent and composition of an army wire system are identical with those for a corps (par. 32). All usable wire lines, both military and commercial, should be incorporated into the army wire system to conserve material and minimize new construction. Repairable wire lines should be restored to service as soon as possible if their rehabilitation is practicable. For detailed information concerning the characteristics of equipment employed in an army signal system, see FM 11-5 and 24-20, and other publications listed in FM 21-6.

b. TELEPHONE SYSTEM. The telephone system, although more extensive than the telegraph (teletypewriter) system, must be coordinated with the latter, so that full use may be made of all previously existing or army-installed trunk circuits. The number of telephones to be installed and the number of local trunk circuits to be established depend upon the communication requirements of the tactical situation, the condition of existing wire facilities, orders of the commander, the time, equipment, and supplies available, and capabilities of the personnel in the army signal service. The requirements tabulated in subparagraphs c and e following are to be used as a *guide only*.

c. LOCAL TELEPHONE REQUIREMENTS. In a complete army installation, telephones should be provided as shown in the following table. Various staff sections and activities require more than one local circuit, depending on the volume of traffic, and some circuits require extensions (more than one telephone on the same circuit).

LOCAL TELEPHONE INSTALLATIONS FOR AN ARMY

<i>Command post</i>	<i>Rear echelon</i>
Army commander	Message center
Aides	Adjutant general's section
Message center	Chaplain section
Chief of staff	Chemical section*
G-1 section	Engineer headquarters detachment
G-2 section	Finance section
G-3 section	Inspector general's section
G-4 section	Judge advocate general's section
Headquarters army anti-aircraft artillery	Medical section*
Artillery section	Ordnance section*
Representative of supporting aviation	Public telephones
Chemical section*	Quartermaster section
Headquarters company, army	Radio stations
Pigeon lofts	Special services section
Engineer headquarters, army	Transportation pool
Headquarters commandant	Wire chief
Liaison officers	Chief telephone operator
Medical section*	Chief teletypewriter operator
Military police battalion	
Ordnance section*	
Provost marshal	

* May require local telephone service at both echelons.

Public telephones**
Radio stations
Signal section, army
Transportation pool
Wire chief
Chief telephone operator
Chief teletypewriter
operator

** For military use, not commercial public pay stations for personal use.

d. PRIORITY OF INSTALLATIONS. The considerations governing the priority of installation of local telephones for a corps (par. 32*c*) are applicable also for an army.

e. TELEPHONE TRUNK CHANNELS. The following table lists the more important telephone trunk channels, which normally will be required (in varying numbers) to provide communication for an army in the field. The channels shown for any particular unit are not prescribed but are intended as a guide only. The actual number of channels established depends on the army SOP for signal communication, the channels required for adequate tactical control, the capacity and condition of existing facilities, and the amount of new construction recommended by the signal officer. This construction depends upon the time, material, and personnel available and upon the physical condition and morale of the signal troops involved. Some units and activities may actually be connected to the echelon opposite the one shown, as their tactical employment and accessibility to the wire system indicate. Also, trunk channels may be required for some units from both the command post and the rear echelon. Increased use of carrier systems for military purposes

will reduce the number of physical circuits needed to provide the desired channels.

Unit to which connected	Trunk or long local channels
<i>From command post</i>	
Army group, THQ.....	6.
Corps	4 to each corps.
Army reserve.....	2 to each div.
Adjacent armies (3 channels to each flank)	3.
Theater reserve troops.....	Variable.
Supporting air force units (provided by supporting unit).....	2.
Antiaircraft artillery brigade.....	3.
Chemical decontamination companies (1 to each of 3 companies)	3.
Chemical impregnating company...	1.
Chemical field laboratory.....	1.
General service engineer regiments (2 to each of 3 regiments).....	6.
Engineer group.....	2.
Rear echelon.....	4.
Signal construction battalion.....	2.
Signal operation battalion.....	2.
Signal pigeon company.....	1.
Signal radio intelligence company..	1.
Commercial telephone systems.....	Variable.
Landing fields.....	Variable.
Miscellaneous (see note following)	As required.
Commercial system.....	4.
Tank destroyer groups.....	1 to each group.

Unit to which connected	Trunk or long local channels
<i>From rear echelon</i>	
Army group, THQ.....	6.
Medical group.....	2.
Regulating station.....	2.
Replacement depot.....	1.
Ammunition battalions (1 to each of 2 battalions).....	2.
Ordnance maintenance and supply battalion	1.
Gasoline depots.....	1 to each.
Ordnance heavy maintenance bat- talion	1.
Signal repair and photographic companies (1 to each).....	2.
Communications zone.....	6.
Medical supply depot.....	2.
Ammunition supply points.....	1 each.
Depots and depot companies:	
Chemical depot.....	1.
Ordnance depot.....	2.
Quartermaster depot.....	2.
Signal depot.....	1.
Hospitals (4 surgical, 10 evacua- tion, 1 convalescent)	1 each.
Chemical maintenance company...	1.
Railheads	1 each.
Prisoner of war inclosures.....	Variable.
Railroads, stations, yards, offices...	1 each.
Commercial telephone systems.....	4.
Landing fields	Variable.
Miscellaneous (see note following)	As required.
Veterinary company.....	1.
Medical laboratory.....	1.

Note: Trunk channels or long local circuits also must be provided for each engineer, quartermaster, or medical battalion not included in a group, and for various small units of army troops (such as chemical maintenance company, ordnance medium maintenance and heavy maintenance companies, engineer dump truck and shop companies, quartermaster car company, etc.) from either the command post or the rear echelon, depending on their accessibility to the wire system and their locations and tactical employment in the army area. Such additional units as are from time to time attached or assigned to an army to enable it to perform its mission also are served by the wire system whenever practicable.

f. **TELEPHONE SWITCHING CENTRALS.** The general factors governing the types of switching equipment and the location of switching centrals and associated equipment used for corps installations (par. 32*e*) are also applicable for an army wire system. Switching centrals at the headquarters of army troops (other than units of army signal service) are installed by their organic communication troops, unless otherwise specifically directed by the army signal officer. Manuals giving details of military telephone switching equipment are listed in FM 21-6. Authorized switchboards and telephone central office sets are shown in tables of equipment for the various units of army signal service.

77. Teletypewriter and Manual Telegraph Requirements

a. **GENERAL.** The fundamental considerations concerning channels used and the employment of telegraph and teletypewriter equipment for a corps (par. 33) are also applicable for an army.

b. **MANUAL TELEGRAPH SETS.** In an army, manual telegraph sets are reserved normally for use as an auxiliary telegraph facility. However, if sets are available they become a primary means on circuits too long

for satisfactory teletypewriter operation, for communication with units having no teletypewriter equipment, and in the event of teletypewriter failure.

c. **TELETYPEWRITERS.** The teletypewriter is the basic telegraphic facility for an army. All information regarding the use of teletypewriter equipment on a corps wire system (par. 33c) applies also to the use of such equipment for an army system. For the technical details and operating characteristics of military teletypewriter equipment see pertinent manuals listed in FM 21-6. Teletypewriter equipment authorized for the various units of army signal service is shown in tables of equipment for such units.

d. **TELETYPEWRITER STATIONS.** Teletypewriters may be installed at any or all of the following locations, and at such other places as the tactical situation and composition of the army require.

TELETYPEWRITER STATIONS FOR AN ARMY

Command post

Message center

G-1 section*

G-2 section

G-3 section

G-4 section

Rear echelon

Message center

Regulating stations

Prisoners of war enclosures

Railheads

Quartermaster section*

Miscellaneous depots

(signal, engineer, chemical, general, etc.)*

Ordnance section*

Adjutant general's section*

*Installation of these stations will depend primarily on volume of traffic.

e. **TELETYPEWRITER TRUNK CHANNELS.** The fol-

lowing table is to be considered *only as a guide* to the number of trunk channels which may be required by an army.

Unit to which connected	Teletypewriter trunk channels
<i>From command post</i>	
Army group, THQ.....	3.
Corps	2 or more to each.
Army reserve.....	1.
Rear echelon.....	2 or more.
Supporting air force units (provided by supporting unit).	2.
Adjacent armies.....	2 or more to each flank.
Cavalry	2.
Commercial system.....	2.
Radio intelligence company.....	1.
<i>From rear echelon</i>	
Army group, THQ.....	3.
Communications zone.....	3.
Commercial system.....	2.

f. TELETYPEWRITER SWITCHING CENTRAL. Equipment is provided for switching teletypewriter stations and trunk circuits. (FM 11-5 and pertinent Technical Manuals listed in FM 21-6). Since each switchboard normally has a total capacity of 10 lines (to teletypewriters or trunks), three switchboards will be required at the command post and two at the rear echelon to accommodate the trunk channels and teletypewriter stations just mentioned. A maximum of three switchboards may be paralleled to operate as a single switching central.

78. Facsimile

Facsimile communication may be utilized for communication to rear echelon, corps and adjacent armies.

79. Carrier Systems

The basic factors influencing the use of carrier systems on a corps wire system (par. 34) also apply for the army. The use of carrier systems for both telephone and teletypewriter channels is distinctly advantageous if the required equipment is available. The use of carrier channels on all large wire systems permits significant savings in time and construction materials required to provide the necessary channels.

80. Circuit Diagram

A circuit diagram of an army wire system is similar to that of a corps wire system, an example of which is shown in TM 11-462. Approved symbols for use on the circuit diagrams are shown in FM 21-30, 24-20 and TM 11-462, and are to be used on such diagrams to assure uniform interpretation.

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